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ABSTRACT

Psychological procedures change behavior in part by creating and strengthening perceived self-efficacy, which refers to personal judgments of performance capabilities in a given activity. In addition, it has been hypothesized that attributions, or perceived causes of outcomes, exert important effects on self-efficacy. A study investigated how the sequence of extended attributional feedback affected children's attributions, self-efficacy, and achievement. The subjects, 40 fourth and fifth grade students with low reading skills, participated in a training program that included instruction and practice in identifying the important ideas in a reading passage. One group received ability feedback (positive comments on student performance), a second group received effort feedback (positive comments on student efforts), a third group was given ability feedback during the first half of the program and effort feedback during the second half, and this sequence was reversed for a fourth group. Results showed that children who received ability feedback during the second half of the program developed higher ability attributions and self-efficacy than did children in the other conditions. The sequence of extended attributional feedback did not differentially affect skill development. (FL)

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Sequence Effects of Extended Attributional Feedback During Reading Instruction

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Abstract

This experiment investigated how the sequence of ability and effort attributional feedback over an extended period influences children's reading comprehension, attributions, and self-efficacy. Children with comprehension deficiencies participated in a training program that included instruction and practice in identifying important ideas. One group of children (ability-ability) periodically received ability feedback, a second group (effort-effort) received effort feedback, a third condition (ability-effort) was given ability feedback during the first half of the training program and effort feedback during the second half, and for a fourth group this sequence was reversed (effort-ability). Children who received ability feedback during the second half of training (ability-ability and effort-ability conditions) developed higher ability attributions and self-efficacy than subjects in the other two conditions. The sequence of extended attributional feedback did not differentially affect skill development. Implications for teaching are discussed.

Sequence Effects of Extended Attributional Feedback During Reading Instruction

According to Bandura (1977, 1981, 1982), psychological procedures change behavior in part by creating and strengthening perceived self-efficacy, which refers to personal judgments of one's performance capabilities in a given activity. Self-efficacy can influence choice of activities, effort expended, persistence, and task accomplishments. People acquire information about their self-efficacy from their actual performances, by observing others, through persuasion, and from physiological indexes (e.g., heart rate).

Attributions, or perceived causes of outcomes, are hypothesized to exert important effects on self-efficacy (Bandura, 1977; Schunk, 1984). Attributional theories contend that in achievement contexts students often believe that their successes and failures are due to ability, effort, task difficulty, and luck (Frieze, 1980; Weiner, 1979, 1983). Performance expectancies (i.e., self-efficacy) heavily depend on attributions for prior outcomes (McMahan, 1973; Weiner, 1979, 1983). Young children view effort as the prime cause of outcomes and ability-related terms as closely associated (Frieze, 1980), but around Age 9 a distinct conception of ability begins to emerge (Nicholls, 1978). Ability attributions become increasingly important influences on performance expectancies with development, whereas effort attributions decline in importance (Harari & Covington, 1981; Nicholls, 1978, 1979). Once children begin to differentiate the concepts of ability and effort, the perception of less effort required to perform a task should raise self-efficacy more than when greater effort is required, because the latter implies that skills may be lacking (Bandura, 1981; Schunk, 1984).

The effects of ability and effort information also have been investigated in attributional feedback studies (Andrews & Debus, 1978; Dweck, 1975; Miller, Brickman, & Bolen, 1975; Schunk, 1983, in press). Linking past failures with insufficient effort promotes children's persistence and effort attributions (Andrews & Debus, 1978; Dweck, 1975), and effort feedback for prior successes enhances motivation, self-efficacy, and skills (Schunk, 1983). Positive effects on children's achievement also have been obtained from providing ability attributional feedback for prior successes (Miller et al., 1975). Ability feedback promotes self-efficacy and achievement more than effort feedback once children begin to form a distinct conception of ability (Schunk, 1983).

Recent research shows that the sequence of attributional feedback can influence children's self-efficacy and achievement (Schunk, in press). In this study, children lacking subtraction skills participated in a training program that included instruction and problem solving. One group of students periodically received ability feedback, a second group received effort feedback, a third condition was given ability feedback during the first half of training and effort feedback during the second half, and for a fourth group this sequence was reversed. Students who initially received ability feedback (ability-ability and ability-effort conditions) developed higher ability attributions, self-efficacy, and skills, than those initially given effort feedback.

Schunk (in press) explained these effects as follows. Early successes constitute a prominent cue for forming ability attributions (Frieze & Weiner, 1971; Weiner, 1974). As children successfully solved problems during training they likely believed that they were becoming more competent, and telling them

that ability was responsible for their early successes supported this belief (Schunk, 1983, in press). Children may have viewed subsequent effort feedback (i.e., the ability-effort condition) more as a reflection of how diligently they had been applying their skills than as an indicator of their level of competence (Schunk, in press). Although early effort feedback also should have led to higher self-efficacy, students might have wondered how competent they really were if they had to work hard to succeed and whether they could sustain the high effort required for success. Children might have questioned the credibility of subsequent ability feedback (effort-ability condition) after repeatedly being told that their successes were due to effort (Schunk, in press).

These benefits of ability feedback for early successes must be qualified due to the short-term nature of the Schunk (in press) research. Children received attributional feedback over four training sessions, five times per session or 20 times total. Over a longer time period, attributional feedback given for later successes might influence self-efficacy and achievement. Providing extended ability feedback should eventually lead to higher ability attributions and self-efficacy among effort-ability children, because continuing successes over time ought to enhance the credibility of the ability feedback. In contrast, extended effort feedback could lead ability-effort children to begin to doubt their capabilities, because they might wonder why they now must work hard to succeed. Such self-doubts would not enhance ability attributions or self-efficacy.

The purpose of the present study was to investigate how the sequence of extended attributional feedback affects children's attributions, self-efficacy and achievement. Children low in reading skills participated in a

comprehension training program over 15 sessions, during which they periodically received attributional feedback. Students were assigned to one of four treatments distinguished by the feedback sequence (Schunk, in press): ability-ability, ability-effort, effort-ability, effort-effort.

Based on the preceding considerations, it was predicted that providing children with ability feedback during the second half of the training program (i.e., the ability-ability and effort-ability conditions) would lead to higher ability attributions, self-efficacy and skills, compared with providing effort feedback for later successes (ability-effort and effort-effort conditions). It also was predicted that students in the latter two conditions would make higher effort attributions, because extended effort feedback during the second half of training was expected to increase the salience of effort as a cause of success.

Method

Subjects

The subjects were 40 fourth and fifth grade children drawn from two elementary schools within one school district. The 19 boys and 21 girls ranged in age from 9 years 5 months to 13 years 0 months (M = 10.8 years). Although different socioeconomic backgrounds were represented, children predominantly were lower-middle class. Subjects regularly received remedial reading comprehension instruction. Students had been placed in remedial classes by the school district based on the following criteria: fourth graders scored below grade level equivalent 1.9 on the reading subtest of the Iowa Test of Basic Skills (Lindquist & Hieronymus, 1972), whereas fifth graders scored below grade level equivalent 3.0.

Pretest

Subjects initially were administered the pretest individually by a female adult tester drawn from outside the school.

Self-efficacy. Children's self-efficacy for answering reading comprehension questions correctly was measured following procedures of previous research (Schunk & Rice, in press). The efficacy scale ranged from 10 to 100 in 10-unit intervals from 10--high uncertainty, to 100--complete certitude. Students initially received practice by judging their certainty of successfully jumping progressively longer distances ranging from a few inches to several yards. In this concrete fashion, children learned the meaning of the scale's direction and the different numerical values.

Following this practice, students read eight passages one at a time. Passages ranged from 4 to 25 sentences; two passages each were appropriate for grades three through six (Cohen & Foreman, 1978). Each passage was followed by one to four questions that tapped comprehension of important ideas (e.g., "What is the most important idea in this story?", and, "What is a good title for this passage?"). The 8 passages included a total of 20 questions. Passages and questions corresponded in reading level to those on the ensuing skill test although they were not identical.

After children read each passage, the tester read its questions one at a time. For each question, students privately judged their certainty of answering correctly questions of that type. Thus, children were judging their capability of answering different types of questions rather than whether they could answer particular questions. To preclude students from actually answering the questions, children were not allowed to consult passages, and questions did not appear on children's test pages. Students were advised to

be honest and mark the efficacy value that matched how they really felt. Efficacy scores were averaged across the 20 judgments.

Reading comprehension skill. The skill test, which was administered immediately following the efficacy assessment, included 8 passages with 20 questions that ranged in difficulty as above. The tester presented each passage, along with its one or more multiple choice questions, one at a time. After children read each passage, they answered its questions without assistance or performance feedback. The test took about 20 min to administer. The measure of skill was the number of questions answered correctly.

Training Procedure

Following the pretest, children were assigned randomly within sex and school to one of four experimental conditions (n = 10 per condition) distinguished by the sequence of attributional feedback: ability-ability, ability-effort, effort-ability, effort-effort. All students received 30-min training sessions over 15 consecutive school days, during which they worked on instructional materials that covered comprehension of important ideas.[1]

Children assigned to the same experimental condition met in small groups of 3-5 with a female adult proctor who was drawn from outside the school. Written on a nearby poster board were the following strategies, which were similar to those used in previous research but modified slightly to address comprehension of important ideas (Schunk & Rice, in press):

> What do I have to do? (1) Read the questions. (2) Read the passage to find out what it is mostly about. (3) Think about what the details have in common. (4) Think about what would make a good title. (5) Reread the story if I don't know the answer to a question.

At the start of the first training session, the proctor distributed instructional materials, pointed to the poster board, and verbalized the five strategies aloud. She explained that these steps helped students answer questions about important ideas. The proctor then demonstrated their application to a sample passage by verbalizing aloud, "What do I have to do? Read the questions." The proctor then read aloud the multiple-choice questions for the first comprehension passage while children followed along, after which she pointed to and verbalized strategies (2) and (3). The proctor explained that details referred to bits of information and gave some examples, and said that while she was reading the passage she would be thinking about what the details had in common. She then read the passage aloud. The proctor pointed to and verbalized strategy (4), and explained that trying to think of a good title helps to remember important ideas in a story. She stated some of the details in the story, explained what they had in common, and made up a title for the story. The proctor then read aloud the first question and its multiple choice answers, selected the correct answer, and explained her selection by referring to the passage. She answered the remaining questions in the same fashion. Questions required identifying the main idea of the passage or a particular paragraph, the narrator's feelings, or the best title for the story.

Following this modeled demonstration, the proctor instructed children to repeat aloud each strategy after she verbalized it. She then said, "What do I have to do? Read the questions." After children verbalized these statements, she selected one student to read the questions aloud. When this child finished, the proctor instructed students to repeat after her strategies (2) and (3). The proctor then called on a different child to read the passage

aloud, after which she asked children to repeat strategy (4) after her. A third student was selected to think of a title for the story and explain his or her answer. The proctor then called on individual children to read aloud each of the questions with its answers and to answer that question. If a child answered a question incorrectly, the proctor instructed the student to repeat strategy (5) after her. The child then reread enough of the passage to answer the question correctly. If students stumbled on a word while reading the proctor prompted with context and phonetic cues.

The training format for the remainder of the first session and the rest of the training program was identical to the above except that the proctor did not model strategies and children did not verbalize each strategy prior to applying it. Instead, she referred to strategies at the appropriate places and occasionally asked children to verbalize them. Proctor instructions were scripted to insure standardized implementation. Occasional observations by the authors confirmed that training procedures were properly implemented.

Treatment Conditions

Ability-ability. Children assigned to this condition received ability attributional feedback 3-4 times per training session, or about 50 times total. Feedback was delivered by the proctor to children individually when they correctly answered a question. The proctor first supplied performance feedback (e.g., "That's correct", or, "Right"), and then delivered the attributional feedback by remarking, "You're good at this." So that the ability feedback would not sound repetitive to students, other similar statements also were used (e.g., "You're good at answering these questions"). In this and the other three treatment conditions, the proctor did not use the

word "good" while delivering performance feedback (e.g., "That's good") to prevent confounding ability with performance feedback.

Ability-effort. Children assigned to the ability-effort feedback condition received ability feedback during the first seven sessions and the first half of the eighth session (about 25 times total). Beginning with the second half of the eighth session and continuing through the remainder of the training program, the proctor instead linked each student's successful comprehension with effort by remarking, "You've been working hard" or a similar statement (e.g., "You're working hard"). Thus, each child assigned to this condition also received about 50 attributional feedback statements except that they were evenly divided between ability and effort.

Effort-ability. The procedures for students assigned to this condition were identical to those above except that during the first 7.5 sessions children exclusively received effort feedback. Beginning at the halfway point of the eighth session and continuing for the remainder of the training program the proctor instead delivered ability feedback. As in the preceding condition, each child received about 50 attributional statements evenly divided between effort and ability.

Effort-effort. The procedures for these students were identical to those of the preceding conditions except that each child exclusively received effort feedback throughout the 15 training sessions.

Attributions

Children's attributions for their performances during the training program were assessed on the day after the last session following procedures of previous research (Schunk & Rice, in press). Four scales were shown on a sheet of paper; each ranged in intervals of 10 from 0--not at all, to 100--a

whole lot. The four scales were labeled good at it (i.e., ability), worked hard (effort), easy questions (task), and lucky (luck). Label order was counterbalanced across subjects.

The tester explained to each child individually that this paper showed four things that can help children answer questions. The tester described the scale and each of the attributions, and provided examples of how hypothetical students might mark each scale. Children were advised to think about their work during the training sessions and to mark how much they thought each factor helped them to answer questions. Students also were told that their marks did not have to add to a certain number (e.g., 100). Students privately recorded their ratings.

Posttest

The posttest was administered 1-2 days after the attributional assessment. The instruments and procedures were similar to those of the pretest except that parallel forms of the self-efficacy and comprehension skill tests were used to eliminate possible question familiarity. For any given child, the same tester administered the tests and attributional assessment, had not served as the child's training proctor, and was unaware of the child's experimental assignment.

Results

Means and standard deviations of all measures are presented by experimental condition in Table 1. Preliminary analyses revealed no significant differences due to school or sex of student on any measure, nor any significant interactions between these measures and treatment conditions. There also were no significant between-condition differences on pretest measures or on the number of passages completed during training.

Insert Table 1 about here

Self-Efficacy/Skill

Posttest self-efficacy and reading comprehension skill were analyzed with a multivariate analysis of covariance using pretest self-efficacy and skill as covariates. The four experimental conditions constituted the treatment factor. MANCOVA yielded a significant between-condition difference, Wilks' Λ = .704, $F(6, 66) = 2.26$, $p < .05$. Univariate F tests on each measure revealed a significant difference on self-efficacy, $F(3, 35) = 3.65$, $p < .05$, but not on skill. Post hoc comparisons using the Scheffé test showed that the ability-ability and effort-ability conditions each judged self-efficacy significantly ($p < .05$) higher than the ability-effort and effort-effort conditions. The former two conditions did not differ significantly, nor did the latter two. Thus, extended ability feedback led to higher self-efficacy compared with effort attribution for children's later successes.

Attributions

The four attributions were analyzed with a multivariate analysis of variance using the four experimental conditions as the treatment factor. MANOVA yielded a significant between-condition difference, Wilks' $\Lambda = .413$, $F(12, 87.6) = 2.90$, $p < .01$. Univariate F tests revealed a significant difference between conditions on ability attributions, $F(3, 36) = 4.08$, $p < .05$, and effort attributions, $F(3, 36) = 3.71$, $p < .05$. Post hoc comparisons using the Scheffé test showed that subjects who received ability feedback during the second half of training (ability-ability and effort-ability conditions) placed significantly ($p < .05$) greater emphasis on ability as a

cause of success than children in the ability-effort and effort-effort conditions. The former two conditions did not differ significantly, nor did the latter two. Scheffé analyses on the effort attribution measure revealed that children in the ability-effort condition made significantly ($p < .05$) higher effort attributions than subjects in the ability-ability group; all other comparisons were nonsignificant.

Correlational Analyses

Product-moment correlations were computed among posttest self-efficacy, posttest skill, and the four attributions, to explore theoretically important relationships between variables. Correlations initially were computed separately within each experimental condition. There were no significant between-condition differences in correlations of any measures; therefore, correlations were averaged across conditions using an r to z transformation (Edwards, 1976).

The more emphasis that students placed on ability as a cause of task success, the higher were their subsequent self-efficacy judgments, $r(38) = .36$, $p < .05$. Self-efficacy was positively related to subsequent reading comprehension skill, $r(38) = .45$, $p < .05$.

Discussion

Prior research has demonstrated that the sequence of ability and effort attributional feedback for children's achievements has important effects on attributions and self-efficacy (Schunk, in press). The present results suggest that attributional feedback sequence effects may depend on the duration of feedback. Schunk (in press) found that providing ability feedback for early successes led to higher ability attributions and self-efficacy than did early effort feedback. In the present study, children who received

ability feedback for later successes over an extended period developed higher ability attributions and self-efficacy than subjects who received effort feedback over the same period.

The obtained effects on ability attributions and self-efficacy cannot be due to the amount of feedback, because students in the effort-ability condition received as much ability feedback as ability-effort subjects, but only half as much as ability-ability children received. Nor can these results be due to differences in children's training performances, because treatment conditions completed the same amount of material. It is unlikely that the present treatments differentially affected children's perceptions of how successfully they performed during training, because Schunk (in press) found that the sequence of attributional feedback did not influence such self-perceptions. It also is unlikely that the differences between the present results and those obtained by Schunk (in press) were due to the different subject populations and instructional content areas employed in these two studies. The self-efficacy model is hypothesized to apply to different subject populations and content areas (Bandura, 1977, 1982), and prior research in various achievement contexts supports this view (Schunk, 1984; Schunk & Rice, in press).

An explanation for how the sequence of attributional feedback affects attributions and self-efficacy is as follows. As children successfully perform a task during training they believe that they are becoming more competent. Telling children that ability is responsible for their early successes supports their perceptions of competence and also leads to ability attributions (Schunk, 1983, in press), because early successes constitute a cue used to form ability attributions (Frieze & Weiner, 1971; Weiner, 1974).

When children subsequently are given effort feedback (ability-effort condition), they initially may view it more as a reflection of how diligently they have been applying their skills than as an indicator of their level of competence (Schunk, in press). When later effort feedback is prolonged over time, students may wonder how capable they really are if they have to work hard to succeed and whether they can sustain the high effort required for success. Such doubts could lead children to discount the earlier ability feedback and could diminish their self-efficacy.

Attributing children's early successes to effort can raise self-efficacy, because effort feedback implies that children can continue to succeed with hard work (Schunk, 1983, in press); however, effort feedback does not promote ability attributions or self-efficacy as well as ability feedback. The credibility of subsequent ability feedback (i.e., the effort-ability condition) initially may be questioned by children after repeatedly being told that their successes were due to effort (Schunk, in press). Such discounting is likely to cease over time as students continue to succeed and believe that they are becoming more competent. As ability feedback gains credibility, students are apt to formulate ability attributions and develop higher self-efficacy for continued success.

This explanation is only suggestive, because neither the present study nor the Schunk (in press) experiment included duration of attributional feedback (regardless of type) as an experimental variable. To further our understanding of attributional feedback sequence effects, future research should assess the effects of feedback duration by including different levels (e.g., short-long) in the same study. Such research might focus on mixed feedback treatments (i.e., ability-effort and effort-ability), because both

the present study and the Schunk (in press) study found that ability-ability feedback leads to higher ability attributions and self-efficacy than does continuous effort feedback.

Contrary to the Schunk (in press) findings, the sequence of attributional feedback did not affect reading comprehension skill. The present skill—identifying important ideas--is difficult for remedial readers. When skills develop slowly, significant variations in skill gains due to experimental treatments over a three week period may not be very likely. In contrast, Schunk (in press) gave subtraction training to children who had difficulties with subtraction in their classes but who were not receiving remedial instruction and were not considered low achievers by their teachers. Under these conditions, skills can develop more rapidly and differences in skill development due to experimental treatments become more likely. It also should be emphasized that a variable such as the sequence of attributional feedback is not the only influence on skill development. Instructional method is very important, and all of the present subjects were exposed to the same method. Schunk and Rice (in press) found that instructional methods differentially affected reading comprehension skills among remedial readers. Other research using path analysis shows that instructional treatments exert both direct effects on skill development as well as indirect effects through increases in self-efficacy (Schunk, 1984).

Ability-effort children made higher effort attributions than ability-ability subjects, but otherwise conditions did not differ in effort attributions. Schunk (in press) also found that the sequence of attributional feedback did not affect effort attributions. These two sets of results conflict with developmental evidence indicating that children use inverse

compensation in judging effort from ability information (Kun, 1977; Surber, 1980); that is, they infer less effort as outcomes are presented as resulting from higher ability. The students in the present experiment and the Schunk (in press) study lacked skills and realistically had to expend some effort during training. As such, their actual efforts may have led to effort attributions regardless of the type of feedback. Conversely, children in the Kun (1977) and Surber (1980) studies made attributional judgments of hypothetical persons. When students lack their own performance cues they ought to rely more on externally supplied information in forming attributions.

Consistent with previous research, this study supports the idea that, although self-efficacy is influenced by one's performances, it is not merely a reflection of them (Schunk & Rice, in press). Treatment conditions did not differ in the number of comprehension exercises completed during training but children who received ability feedback for their later successes subsequently judged self-efficacy higher. This study also shows that self-efficacy bears an important relationship to achievement. Personal expectations for success are viewed as important influences on behavior by different theoretical approaches to achievement (Bandura, 1981; Covington & Omelich, 1979; Kukla, 1972; Schunk, 1984; Weiner, 1983).

This study has applied implications. Small-group remedial reading instruction is common in schools, and attributional feedback can be easily delivered by teachers. Remedial groups typically work on the same reading skill over an extended period, so how prolonged attributional feedback affects achievement behaviors must be considered. The present study suggests that extended effort feedback for successes is best avoided. At the same time, this finding must be qualified. Although the skill of identifying

important ideas was difficult for these students, they experienced at least moderate success during training. On a very difficult task, where the probability of success is lower, extended effort feedback might be highly credible and enhance self-efficacy better than ability feedback, because students realistically will have to expend much effort to succeed. Teachers who sequence their attributional feedback based on task difficulty and students' actual effort expenditure should help promote students' skills and self-efficacy for applying them.

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Footnote

[1]The training format and materials were similar to those typically used during children's remedial reading instruction. The sources from which the test items and instructional materials were drawn can be obtained from the first author.

Table 1

Means (and Standard Deviations)

Measure	Phase	Experimental Condition: Ability-Ability	Ability-Effort	Effort-Ability	Effort-Effort
Self-Efficacy[a]	Pretest	70.3 (19.1)	65.6 (16.8)	69.2 (16.4)	64.6 (17.9)
	Posttest	88.9 (9.2)	72.9 (12.8)	87.8 (11.9)	72.2 (12.4)
Skill[b]	Pretest	5.9 (3.6)	5.8 (2.6)	5.2 (3.9)	5.5 (3.2)
	Posttest	9.0 (2.0)	8.9 (3.3)	9.5 (2.2)	9.0 (3.4)
Ability[c]	---	86.0 (15.1)	60.0 (20.1)	84.0 (17.3)	58.0 (20.2)
Effort[c]	---	71.0 (22.8)	96.0 (8.4)	79.0 (20.8)	91.0 (19.1)
Task[c]	---	45.0 (37.8)	69.0 (26.0)	63.0 (33.7)	46.0 (22.2)
Luck[c]	---	38.0 (24.4)	48.0 (31.2)	47.0 (25.0)	41.0 (34.5)

Note. $N = 40$; $n = 10$ per condition.

[a]Average judgment per question; range of scale: 10 (low) - 100.

[b]Number of correct answers on 20 questions.

[c]Range of scale: 0 (low) - 100.